F i n i s a r

Product Specification

SNAP12 Parallel Transmitter and Receiver Modules
Industrial Temperature

FTXD02SL1T / FRXD02SL1T

PRODUCT FEATURES

- 12-channel transmitter and receiver modules
- SNAP12 form factor
- Multirate capability: 1Gb/s to 2.7Gb/s per channel
- Maximum link length of 600m at 2.5Gb/s on OM3 Multimode Fiber (MMF)
- Unretimed electrical interface
- 3.3V power supply required
- Reliable VCSEL array technology
- Industrial operating case temperature range of -40ºC to 85ºC
- MPO type connector
- RoHS-6 compliant (lead-free)

Product Photo

APPLICATIONS

- Interchassis connections

Finisar's SNAP12 transmitter and receiver modules are designed to be used in links of up to 32 Gigabit per second over multimode fiber. They are RoHS-6 compliant and lead-free per Directive 2002/95/EC[1], and Finisar Application Note AN-2038[2]

PRODUCT SELECTION

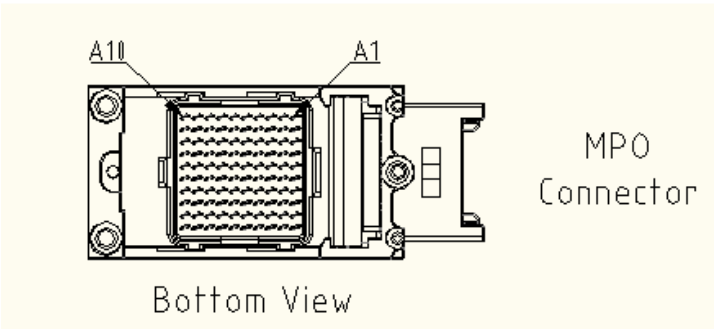
Part Number	Description
FTXD02SL1T	12-channel SNAP12 transmitter module
FRXD02SL1T	12-channel SNAP12 receiver module

I. Transmitter Pin Assignment

	K	J	H	G	F	E	D	C	B	A
1	NIC	NIC	NIC	GND	GND	GND	GND	GND	GND	NIC
2	NIC	NIC	NIC	GND	GND	DIN6P	GND	GND	DIN9P	GND
3	NIC	VCC	VCC	GND	DIN5P	DIN6N	GND	DIN8P	DIN9N	GND
4	NIC	VCC	VCC	DIN4P	DIN5N	GND	DIN7P	DIN8N	GND	NIC
5	NIC	VCC	VCC	DIN4N	GND	DIN3P	DIN7N	GND	DIN10n	GND
6	NIC	VCC	VCC	GND	DIN2P	DIN3N	GND	DIN11n	DIN10p	GND
7	NIC	NIC	NIC	DIN1P	DIN2N	GND	DIN12n	DIN11p	GND	NIC
8	NIC	RESET-	FAULT-	DIN1N	GND	GND	DIN12p	GND	GND	NIC
9	NIC	TXEN	TXDIS	GND	GND	GND	GND	GND	GND	NIC
10	NIC	SDA	SCL	NIC	NIC	NIC	NIC	NIC	NIC	NIC

Figure 1 – Transmitter 100pin MSA connector assignments as viewed from the topside of the customer line card (Toward MPO connector end of module)

Signal Name	Signal Description	I/O	Type
Din[12:1]P	Transmitter Data Non-inverting Input for channels 11 through 0	I	CML
Din[12:1]N	Transmitter Data Inverting Input for channels 11 through 0	I	CML
NIC	Reserved – Do Not Connect to any voltage on Host PCB		
GND	Signal Common ground		
Reset-	Reset signal to module, Asserted Low. Internal pullup.	I	
FAULT–	Transmitter Fault indicator. Logical Low indicates fault	O	
TXDIS	Laser disable; LOW = normal operation if TXEN normal; HIGH = lasers off; internal pull-down,	I	LVTTL
TXEN	Laser enable; HIGH = normal operation if TXDIS normal; LOW = lasers off; internal pull-up.	I	LVTTL
SDA	I2C data signal, internal pull-up with a 10 kΩ resistor.	I/O	
SCL	I2C clock signal. Internal pull-up with a 10kΩ resistor.	I	
Vcc	3.3 V Power supply, external common connection of pins required – not common internally		

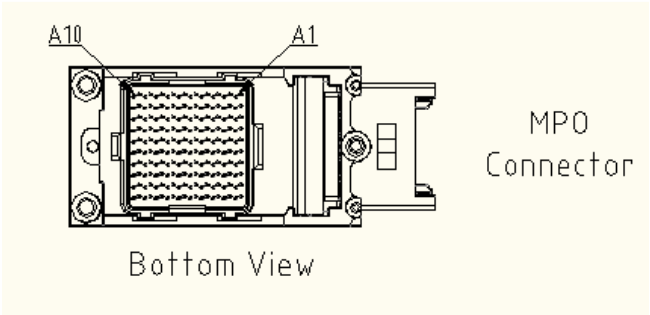


II. Receiver Pin Assignment

	K	J	H	G	F	E	D	C	B	A
1	Vpp	NIC	NIC	GND	GND	GND	GND	GND	GND	NIC
2	Vpp	NIC	NIC	GND	GND	DOUT6N	GND	GND	DOUT9N	GND
3	NIC	VCC	VCC	GND	DOUT5N	DOUT6P	GND	DOUT8N	DOUT9P	GND
4	NIC	VCC	VCC	DOUT4N	DOUT5P	GND	DOUT7N	DOUT8P	GND	NIC
5	NIC	VCC	VCC	DOUT4P	GND	DOUT3N	DOUT7P	GND	DOUT10p	GND
6	NIC	VCC	VCC	GND	DOUT2N	DOUT3P	GND	DOUT11p	DOUT10n	GND
7	NIC	NIC	SD	DOUT1N	DOUT2P	GND	DOUT12p	DOUT11n	GND	NIC
8	Vpp	-SD12	SD1	DOUT1P	GND	GND	DOUT12n	GND	GND	NIC
9	Vpp	RXEN	ENSD	GND	GND	GND	GND	GND	GND	NIC
10	SQEN	SDA	SCL	NIC	NIC	NIC	NIC	NIC	NIC	NIC

Figure 2 – Receiver 100pin MSA connector assignments as viewed from the topside of the customer line card (Toward MPO connector end of module)

Signal Name	Signal Description	I/O	Type
DOUT[12:1]P	Receiver Data Non-inverting Input for channels 11 through 0	I	CML
DOUT[12:1]N	Receiver Data Inverting Input for channels 11 through 0	I	CML
NIC	Reserved – Do Not Connect to any voltage on Host PCB		
GND	Signal Common ground		
SDA	I2C data signal. Internal pull-up with a 10 kΩ resistor.	I/O	
SCL	I2C clock signal. Internal pull-up with a 10 kΩ resistor.	I	
SQEN	Squelch enable; HIGH = all data outputs driven to logic zero when SD is active (LOW); LOW = squelch disabled; internal pull-up	I	LVTTL
ENSD	Signal detect enable; HIGH = normal operation; LOW = signal detect output(s) forced active; internal pull-up	I	LVTTL
RXEN	Output enable; HIGH = normal operation; LOW = receiver disabled; internal pull-up	I	LVTTL
SD	Global signal detect; HIGH = normal operation; LOW = inadequate power on one or more channels	O	LVTTL
SD1	Signal detect channel 1; HIGH = normal operation; LOW = inadequate power on channel 1	O	LVTTL
Vcc	3.3 V Power supply, external common connection of pins required	I	
Vpp	Not required on this product. Pads not internally connected.	I	



III. Absolute Maximum Ratings

The following table represents the absolute maximum ratings for the SNAP12 transmitter and receiver modules. Absolute maximum is defined as the maximum point of exertion without permanent damage to the SNAP12 modules.

Parameter	Symbol	Min	Max	Unit	Ref.
Storage case temperature range	T_S	-40	85	°C	1
Static discharge voltage	ESD		500	V	2
Relative humidity (non-condensing)	RH	5	95	%	
Supply voltage	V_{CC}	-0.5	+3.6	V	

Notes:
1. Operation guaranteed for bit rates up to 2.7 Gbps.
2. Human Body Model (HBM).

IV. Power Supply Information

Parameter		Symbol	Min	Typ	Max	Unit	Ref.
Supply voltage		V_{cc}	3.13	3.30	3.47	V	1, 2
Steady supply current	Transmitter module	I_{CC}		350	420	mA	1, 2
	Receiver module	I_{CC}		400	450	mA	1, 2

Notes:
1. Performance will be guaranteed as long as the supply voltage range is within the defined parameters.

V. Transmission Specification

Parameter		Min	Typ	Max	Unit	Ref.
Bit rate	Transmitter (per channel)	1	2.5	2.7	Gbps	
	Receiver (per channel)	1	2.5	2.7	Gbps	
Fiber link length @2.5Gbps	500 MHz·km 50µm MMF			300	m	1
	2000 MHz·km 50µm MMF			600	m	1

Notes:
1. BER<1e-12, PRBS 2^23-1.

VI. Control and Status Signal Level Specification

Parameter	Min	Typ	Max	Unit
Input voltage - logic LOW	-50		800	mV
Input voltage - logic HIGH	2000		Vcc	mV
Input current			125	µA

Output voltage - logic LOW	GND		400	mV
Output voltage - logic HIGH	2400		VCC	mV
Output current high resistance			10	µA

VII. Trasmitter Module Performance (T_{OP} = -40 to 85°C, V_{CC} = 3.3 ± 5% Volts)

The following characteristics are defined over the Recommended Operating Conditions of -40°C to +85°C case temperature and Vcc = 3.3V ±5%.

Typical values are defined at a case temperature of 40°C, Vcc = 3.3V, bit rate of 2.5Gbps with PRBS 2^23-1

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Optical Interface Characteristics						
Connector type			MPO			
Center wavelength range	λ	830		860	nm	
Spectral width (rms)				0.85	nm	
Output power average (per channel)	PO AV	-8		-2	dBm	
Output power average (per channel) with Tx Disable asserted				-30	dBm	
Extinction ratio	ER	6			dB	1
Optical Modulation Amplitude (OMA)		-7.2			dBm	
Accumulated deterministic jitter				60	ps	
Accumulated total jitter				120	ps	
High-Speed Electrical Interface Characteristics						
Differential input swing (P-P)	Vin,pp	200		1900	mV	1
Input termination resistance, differential		80	100	120	ohm	2

Notes:
1. At 2.5Gbps, BER=1E-12, PRBS 2^23-1.
2. DC-coupled internally.

VIII. Receiver Module Performance (T_{OP} = -40 to 85°C, V_{CC33} = 3.3 ± 5% Volts)

The following characteristics are defined over the Recommended Operating Conditions of -40°C to +85°C case temperature and Vcc = 3.3V ±5%.

Typical values are defined at a case temperature of 40°C, Vcc = 3.3V, bit rate of 2.5Gbps with PRBS 2^23-1

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Optical Interface Characteristics						
Connector type			MPO			
Wavelength range	λ	830		860	nm	
Input optical power sensitivity	Pin min		-18	-16	dBm	1
Return loss		12			dB	
Overload	Pin max	-2			dBm	
LOS De-Assert			-21		dBm	
LOS Assert			-23		dBm	
LOS Hysteresis			2.5		dB	
High-Speed Electrical Interface Characteristics						
Differential output swing (P-P)	Vout,pp	500		670	mV	2
Output termination resistance, differential		80	100	120	ohm	3

Notes:
1. 2.5Gbps, BER=1E-12, PRBS 2^23-1 with Extinction Ratio of 6dB minimum.
2. BER=1E-12, PRBS 2^23-1.
3. DC-coupled internally.

IX. Operating Temperature Performance Ratings

Finisar SNAP12 modules have an operating case temperature range of -40°C to +85°C.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Operating case temperature range	T_C	-40		85	°C	1
Storage case temperature range	T_S	-40		85	°C	
Power consumption – Transmitter	P_{MAX-TX}		1.15	1.80	W	
Power consumption – Receiver	P_{MAX-RX}		1.32	1.80	W	

Notes:
1. Performance guaanteed for bit rates up to 2.7 Gbps.

X. Regulatory Compliance

Finisar FTXD02SL1T and FRXD02SL1T modules are RoHS-6 Compliant. Copies of certificates are available at Finisar Corporation upon request.

The FTXD02SL1T transmitter modules are Class 1M laser products, meaning that they are eye safe under normal "unaided" viewing conditions. Laser radiation may be hazardous if viewed with magnifying optics.

XI. Mechanical Specifications

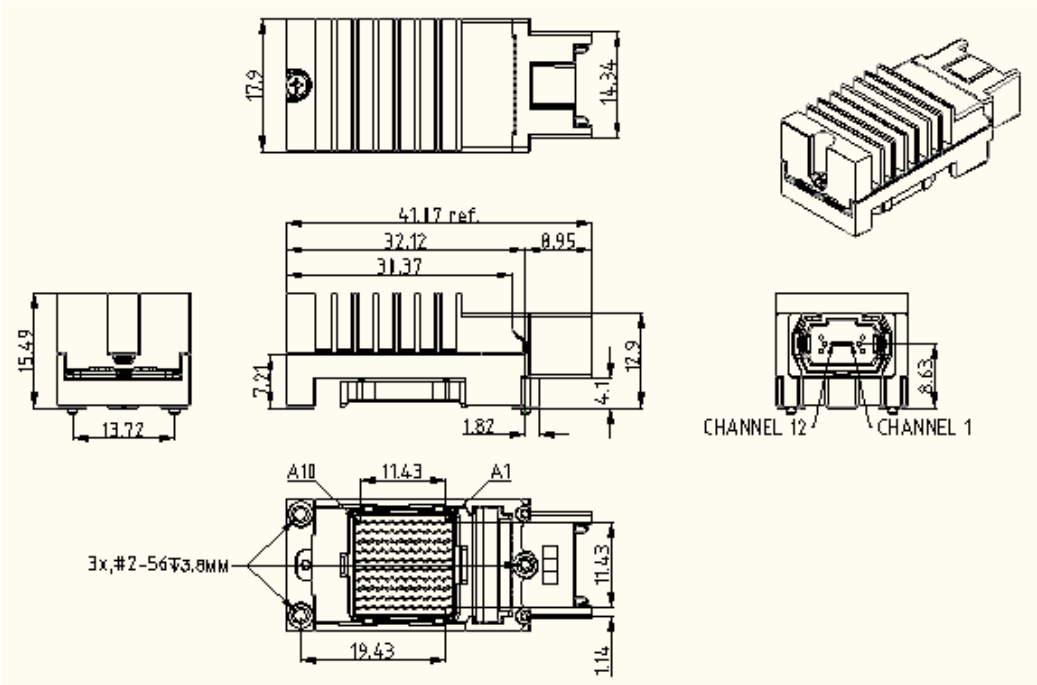


Figure 3 – SNAP12 transmitter module mechanical drawing

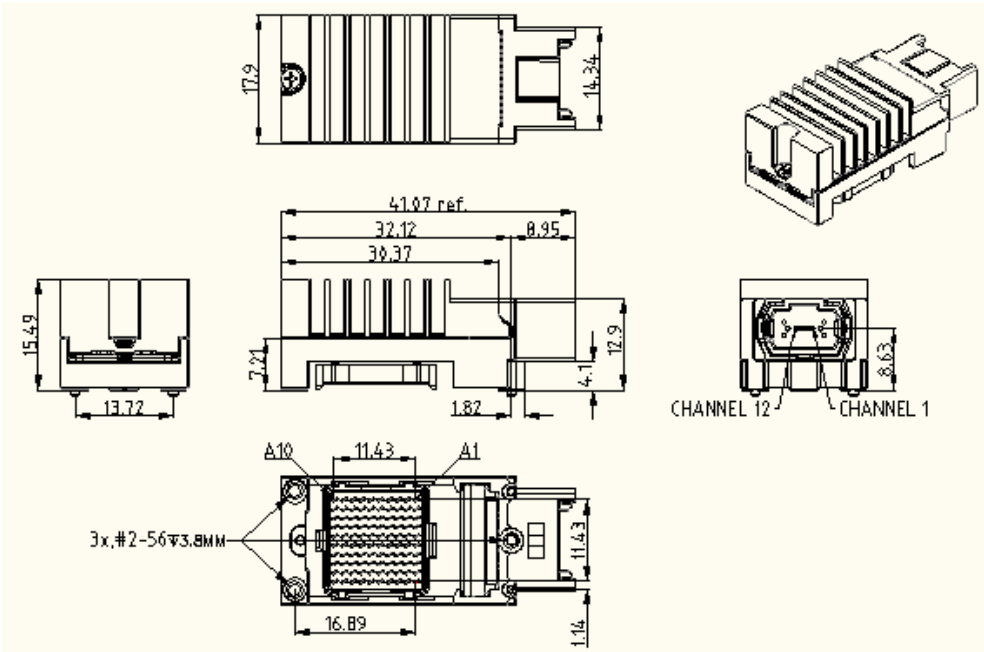


Figure 4 – SNAP12 receiver module mechanical drawing

XII. References

1. Directive 2002/95/EC of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment". January 27, 2003.

2. "Application Note AN-2038: Finisar Implementation Of RoHS Compliant Transceivers", Finisar Corporation, January 21, 2005.

XIII. For More Information

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